

REMARKS

Applicant has amended the claims to clarify the present invention. The amendment to Claim 1 incorporates the contents of Claims 3 and 4, which have now been cancelled.

Applicant's invention, as now described in amended Claim 1, the only independent claim herein, is to a fuel cell with an electrolyte membrane having a cathode and a gas diffusion layer arranged in the stated order on one surface of the electrolyte membrane, and an anode and another gas diffusion layer arranged in the stated order on the other surface of the electrolyte membrane. Electricity is generated when an oxidizing gas is distributed along and passed through the cathode-side gas diffusion layer and a fuel gas is distributed along and passed through the anode-side gas diffusion layer. The cathode-side gas diffusion layer has a first layer and a second layer, formed by adhering conductive particles to a fibrous base material, the formation of the first layer and second layer resulting in the formation of a plurality of pores throughout the first layer and second layer, with an active specific surface area of the conductive particles within the first layer being greater than an active specific surface area of the conductive particles within the second layer. The first layer is in contact with the cathode, the second layer is thicker than the first layer, and the second layer is the layer along which the oxidizing gas is distributed and through which the oxidizing gas is passed. Such an arrangement is not taught or suggested in the references cited.

Reconsideration and removal of the rejection of Claims 1-5 as anticipated by, and Claims 6-8, as obvious in view of Wood III (U.S. 6,350,539) are respectfully requested in view of the present amendments to the claims and the following remarks.

Initially, Applicant notes the use of “furnace black” and “acetylene black” in Claim 6. The office Action mentions that the definition of these terms are not clear as these are both carbon black materials. “Furnace black” is carbon black manufactured from heavy oil, whereas “acetylene black” is carbon black manufactured from acetylene. These two kinds of carbon black are different from each other in terms of both their raw materials and manufacturing methods. Since they are different materials, naturally they have different properties, such as specific surface areas.

In the specification of the present application, page 28, lines 9-14, it is noted that Denka Carbon Black is used for the second layer, and Ketjen Black is used for the first layer. “Denka Carbon Black” is acetylene black; “Ketjen Black” is furnace black. This is apparent from, for example, a website related to Denka Black:

([Http://denka.on.arena.ne.jp](http://denka.on.arena.ne.jp)).

As apparent from the explanation above, “carbon black” is a generic term for materials including acetylene black and furnace black. Some “carbon black” have their own unique properties. Acetylene black and furnace black mentioned in the application belong to “carbon black” and yet they are different from each other. They can be easily distinguished from each other.

In the Office Action, it is alleged that Woods III teaches a fuel cell having a membrane electrode or MEA (9) with a cathode (8) and catalyst layers. The layers of the diffusion structure (FIG. 3) include a bulk layer (15) with an absorption layer (14) on a surface of the bulk layer facing the cathode (8), and a desorption layer (16) on an opposite surface facing away from the cathode. As admitted by the Examiner, the diffusion layer has three or more distinct layers. The absorption

layer (14) has low hydrophobicity, low mean pore size, high surface area and high porosity. The desorption layer (16) has high hydrophobicity, high mean pore size, intermediate surface area and high porosity (Col. 7, lines 31-41). The thickness of the layers vary, with absorption layer (14) being between 20 to 150 μm and the desorption layer (16) being between 40 to 400 μm . Oxidizing gas is distributed along the cathode diffusion layer and fuel gas distributed along the anode diffusion layer. Absorption layer (14) is preferably between 20-70 μm thick with a mean pore size of 0.1-1 μm , while the desorption layer is 200-500 μm thick with a mean pore size of 50-150 μm .

In the Woods III reference, however, there is merely a disclosure of a three-layered diffusion layer having porosity with pores of different diameters, which improve gas diffusibility. The cited reference does not disclose any information on the specific surface areas of the conductive particles included in the gas diffusion layer.

More specifically, although the cited reference by Woods III states, column 8, lines 5-7: "Within the individual layers, the bulk density, pore-size distribution, and porosity will govern the value of the surface area parameter", it does not disclose any information on the specific surface areas of the conductive particles, unlike the present application. There is no technical teaching or suggestion about adjusting surface areas based on the specific surface areas of the particles.

In contrast, the conductive particles in the present claimed fuel cell have designated adjusted specific surface areas, as called for in amended Claim 1, which provides the advantages of the present claimed fuel cell.

U.S. Patent Application Serial No. **10/030,155**
Reply to Office Action of **January 29, 2004**

In view of the present amendments to the claims and the above remarks, Applicant's claims 1, 2, and 5-8 are believed to be patentable over the prior art and early action towards allowance thereof is respectfully requested.

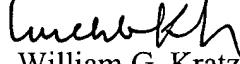
Applicant notes that the Office Action acknowledges the claim to foreign priority but states that the certified copy has not been received. Attached is a copy of PCT/IB/308. Notice of receipt of the requisite copy is requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicant's undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicant respectfully petitions for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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Enclosure: copy of PCT/1B/308